

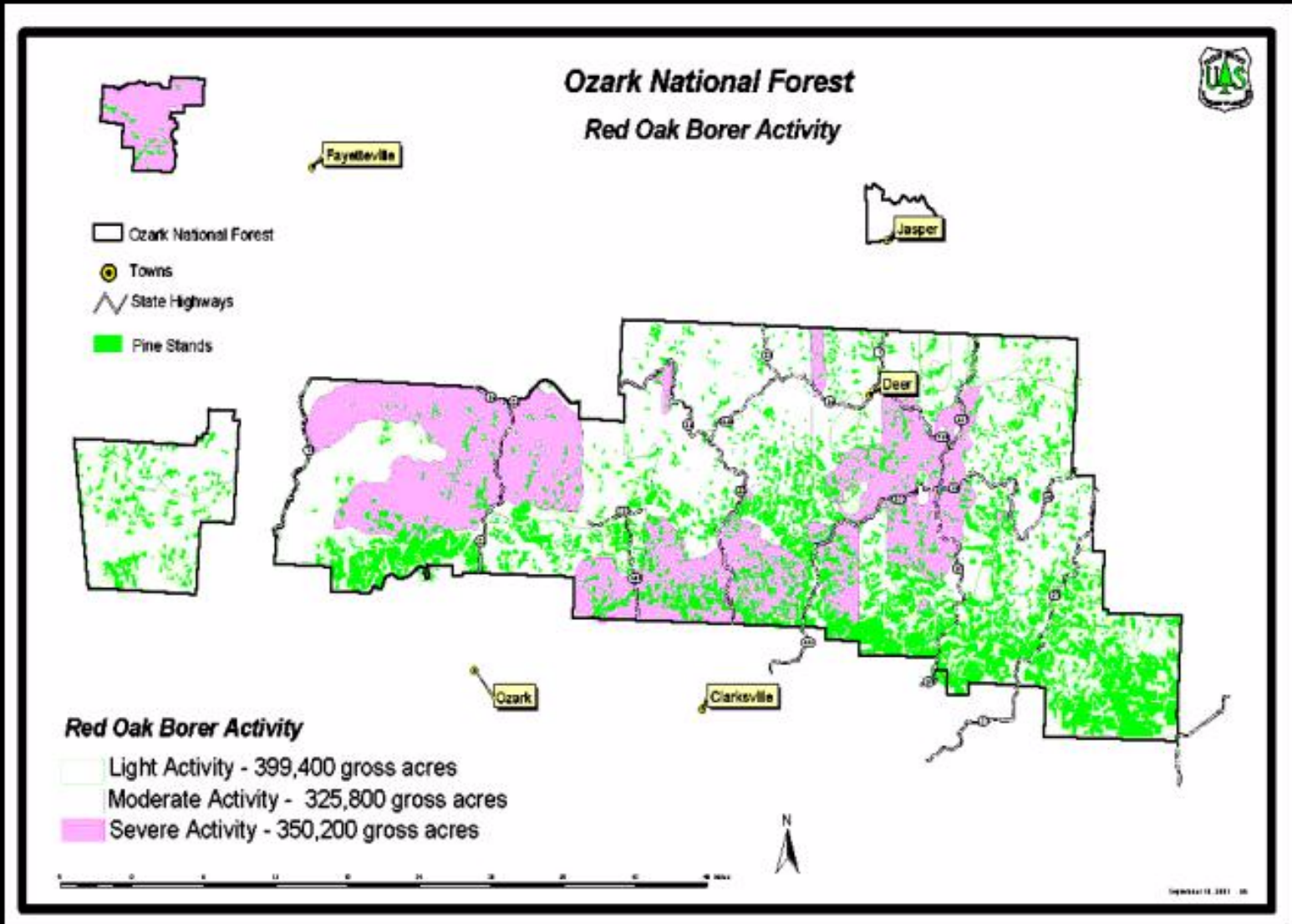
# **OAK MORTALITY ASSESSMENT AND STRATEGIC PLAN OZARK - ST. FRANCIS NATIONAL FORESTS**



Over 300,000 acres of the Ozark-St. Francis National Forests are currently in a severe oak mortality status. These are areas with an estimated 50% or more of the red and white oak trees dead or dying. Many of the remaining oak trees on these sites are showing thinning crowns, which indicate that these trees are stressed and may also die.



# 2000 Activity Assessment



# Ozark-St. Francis National Forests Implementation Plan

- The Ozark-St. Francis National Forests are implementing a strategy to address this threat to the hardwood ecosystem and associated communities of the Ozark Highlands. State and Federal agencies in Missouri and Arkansas are addressing the same issues.

# The Strategy Consists of Five Components:

Public Safety

Public Awareness

Inventory and Assessment

Implementation of Management Strategies  
for Prevention, Suppression, and  
Restoration

Research

# Public Safety

Safety for our forest visitors during the duration of this incident will be our top priority.

The following actions are planned:

Developed recreation sites will be monitored frequently and dead limbs/trees will be removed.

Campsites/hazard areas may be temporarily closed until the hazard is removed. Employees will be trained to identify early stage insect and disease damage. Trails will also receive treatment – primarily at trailheads and on high-use sections.

Warning  
signs will be  
placed on  
bulletin  
boards across  
the forest to  
notify the  
public of  
overhanging  
hazard trees  
and limbs.

# WARNING!

## WATCH FOR FALLING BRANCHES AND TREES

Due to several years of drought and insect infestation many trees in the forest have died.

These trees may not be stable and could present a danger of falling branches or trees.

Be careful in the woods. Weakened trees or branches may fall without warning.

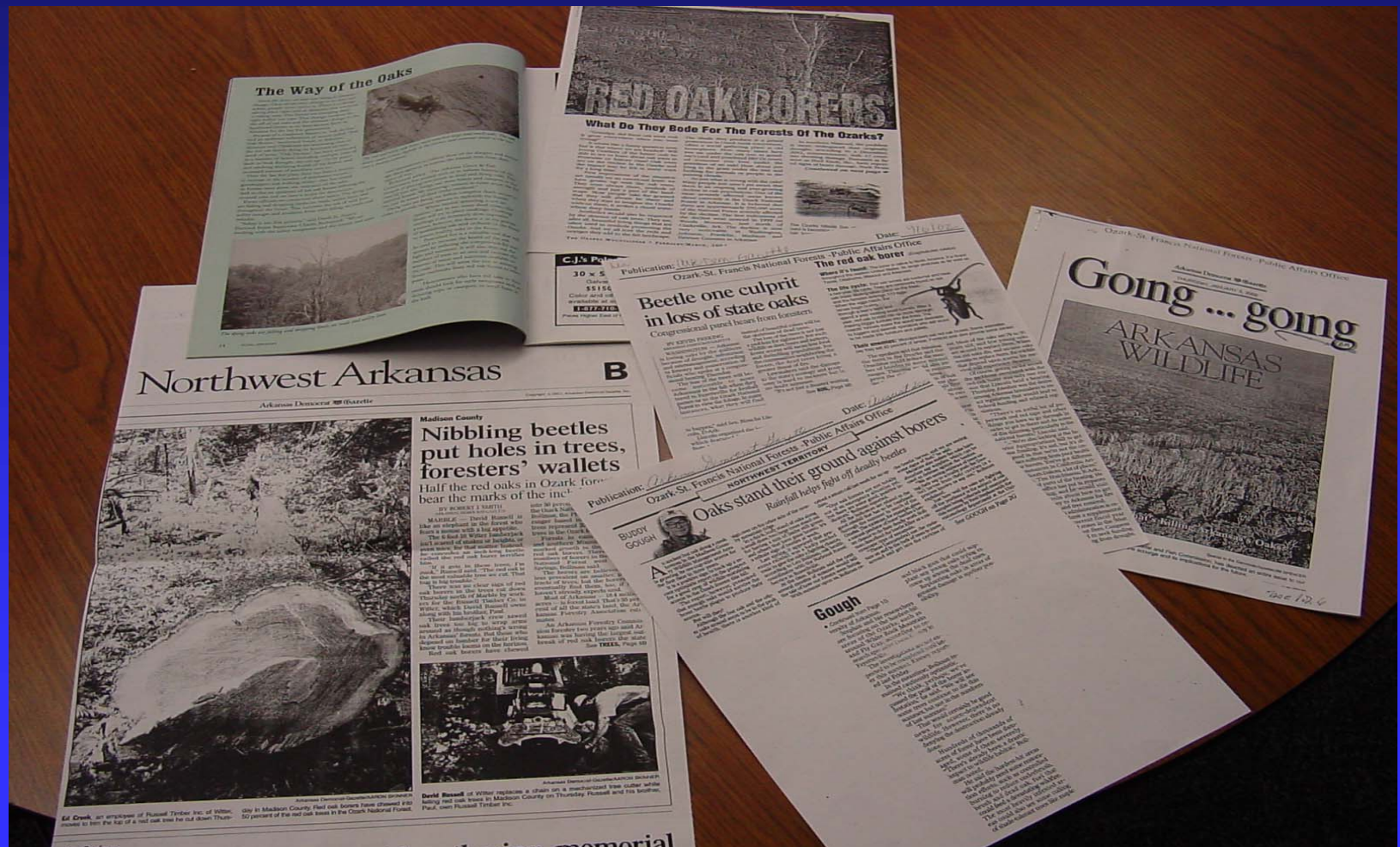
Do not park vehicles or camp under or near dead trees.

Watch for fallen trees and branches on trails and roads.

Be extremely alert when hiking or riding horseback on forest trails or roads during heavy winds, rain or snow.

Do not strike, cut or chop standing dead trees.

# News Releases Will Be Issued to Notify the Public of Dead Tree Hazards



Contacts with hunters have been increased in the fall, alerting them to look for dead trees before locating their camps and ladder stands.



Contacts with State highway departments, County road departments, telephone and electric utility companies, and other special use permittees on the forests will be made to to inform them about the oak mortality situation and the need to remove dead trees. Federal funds may be available to assist state and local governments with removals.



Forest Service jurisdiction roads will have hazard trees removed by various means. Commercial timber sales or contract felling and leaving actions followed by removing firewood in order to reduce the safety and fire hazards and to utilize the wood will be accomplished where possible.



# Public Awareness

Public awareness of the extent of this mortality is complicated by the fact that red oaks are dying in varying stages, while other tree species still survive in these stands. The visual effects are not as evident as with a catastrophic event. We will continue to provide information on the insect life cycles, current Forest Service management priorities, research activities, and impacts to private landowners as opportunities permit us to do so.

Signs will be placed at strategic locations to inform the public of the causes of the changing ecosystem.

## Why Are the Red Oaks Dying?



You may have noticed some of the oak trees dying in the forest. The Forest Service is working with forest health experts to find out why.

At first glance, the deaths seemed to be caused by the red oak borer. However, the red oaks and some white oaks are suffering from oak decline.

Oak decline is a complex phenomenon with no single cause. Conditions predisposing trees to decline are (1) old age, (2) shallow, rocky soils on ridgetop and upper slope locations, and (3) droughts.

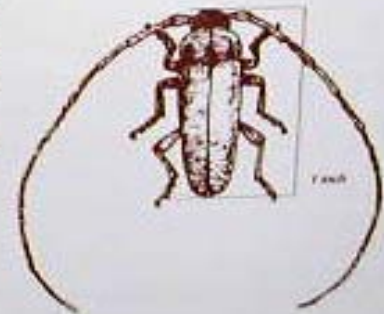
Secondary insects and diseases further stressing and damaging trees are (1) red oak borer, (2) two-lined chestnut borer, (3) armillaria root rot, (4) defoliating insects like walking sticks, and (5) hypoxylon canker.

Healthy and vigorously growing trees normally fight off insect attacks such as the red oak borer. Recent droughts stressed the red oak and the white oak trees, making them vulnerable.

Mortality of northern red, black and southern red oaks in the Ozark and the Ouachita National Forests became very noticeable in 1999 following two years of severe drought. White oaks, hickories and other species were also affected to a lesser degree. The red oak borer population peaked during these years to further weaken trees. They caused damage to wood products by boring tunnels up to 1/2 inch in diameter into the tree trunks. Woodpeckers, the natural predators of red oak borers, were unable to keep up with the rapidly growing insect population.

Scientific studies suggest that control of the outbreak can be achieved by removing red oak borer infested trees. However, the trees are still vulnerable to more insect attacks and disease as a result of the droughts. Forestry practices that maintain and promote tree vigor including cutting weak or damaged trees and thinning to remove some trees from overpopulated stands can help prevent or minimize infestation.

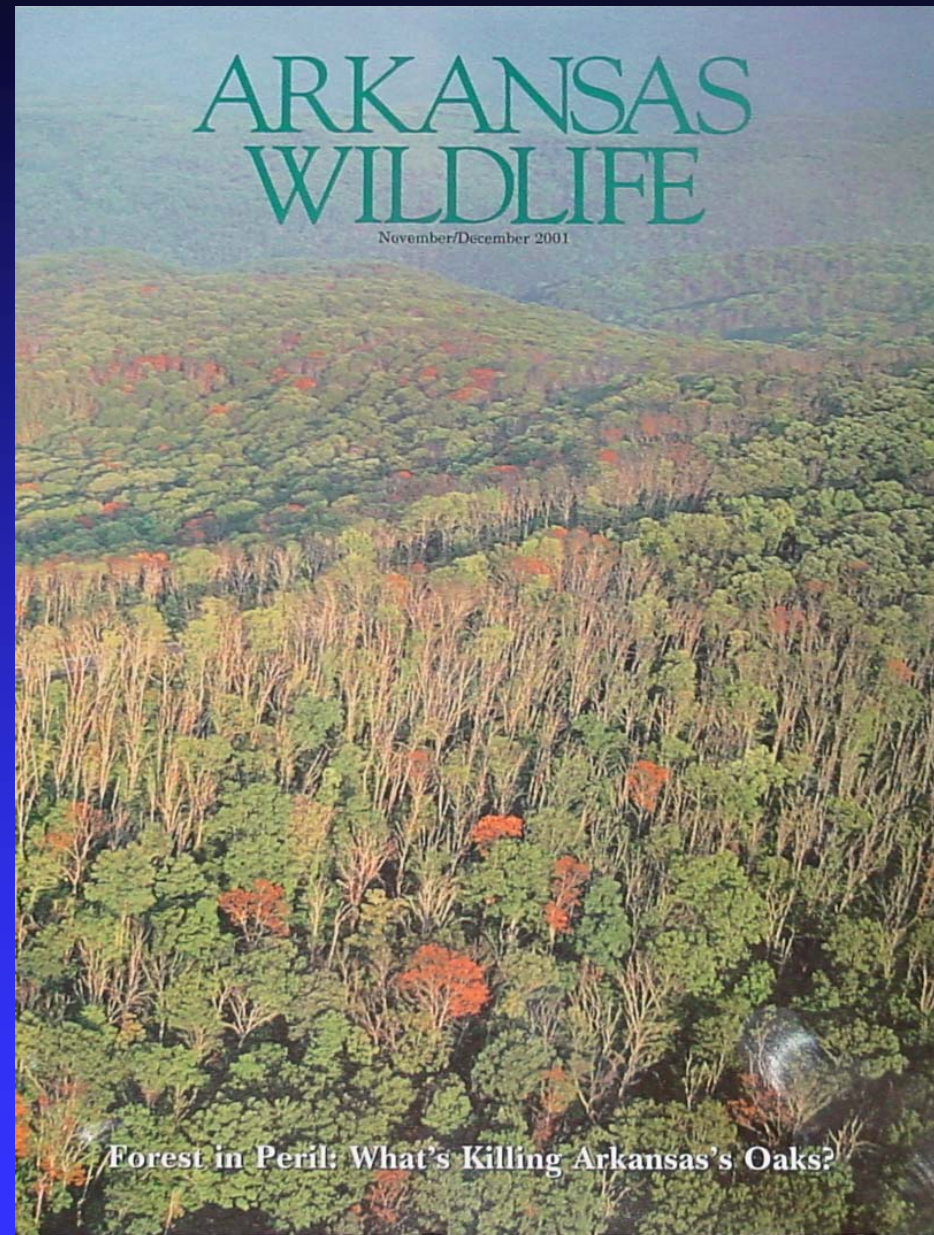
The light brown adult borer lays about 110 eggs during early and midsummer in bark crevices or under patches of lichen on the host tree. After hatching, the shiny white larvae bore into the inner bark leaving tiny particles with fine, exuded resin. These holes become larger and sap-stained as the larvae feed, eventually creating a tunnel about 1/2 inch in diameter and 6 to 10 inches long. In its second year the larvae tunnel into the wood and pupate. The adult exits through the bark near the entrance hole.



- The oak mortality brochure developed in 1999 has been revised to update information and include all forests in the Ozark Highlands region including the Ouachita and Mark Twain National Forests.



■ The November/December 2001 edition of the Arkansas Game and Fish Commission magazine was entirely devoted to oak mortality and the importance of the oak ecosystem to Ozark wildlife. The special issue was distributed to all licensed hunters and to subscribers.



- Classroom and field training for Arkansas Forestry Commission personnel on oak mortality was conducted in January 2002.
- Landowner workshops were conducted in April and May 2002 in cooperation with the Arkansas Forestry Association.
- Several teacher workshops with Oak Decline as a topic have been held in various locations.

- A Symposium on Oak Sustainability in the Ozark Highlands region was held in early October 2002 at Fayetteville, Arkansas with over 350 scientists, land managers, teachers, and students attending. A field trip was conducted to the Ozark National Forest for an overview of Oak Mortality.



- Presentations will continue to be given to groups such as this as long as the interest is expressed. Rotary, Lion's Club, Kiwanis clubs, professional organizations, and other special interest groups will be scheduled if the Forest Service at Russellville is contacted.

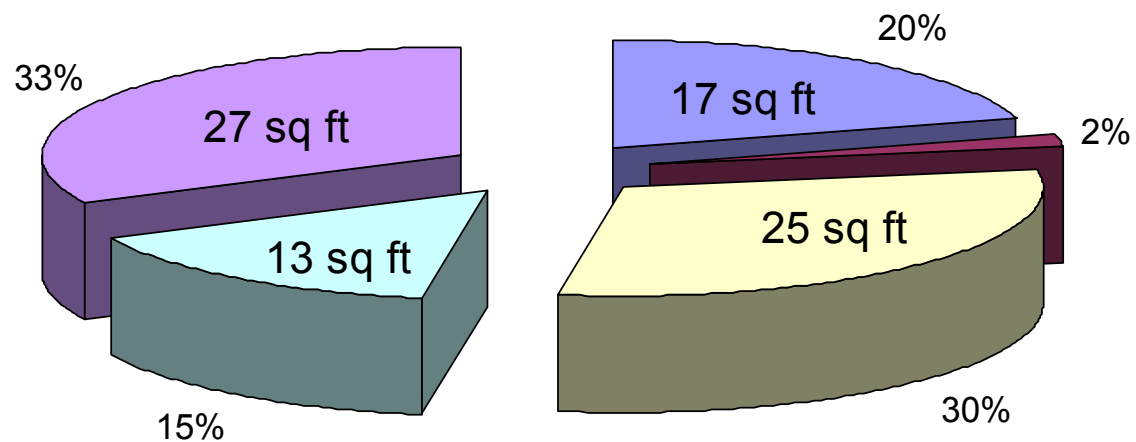
## Inventory and Assessment

Two aerial visual damage assessments have been completed. Spring 1999 showed an estimated 19,000 acres of severe damage. Spring 2001 estimated in excess of 300,000 acres of severe damage. During the summer of 2001, field plots were taken on 15,000+ acres of severe damaged stands. The results are shown in the following graphs:

## BA of Live and Dead Trees >=6 inches in DBH

Total BA Pre-RO borer 85 sq ft

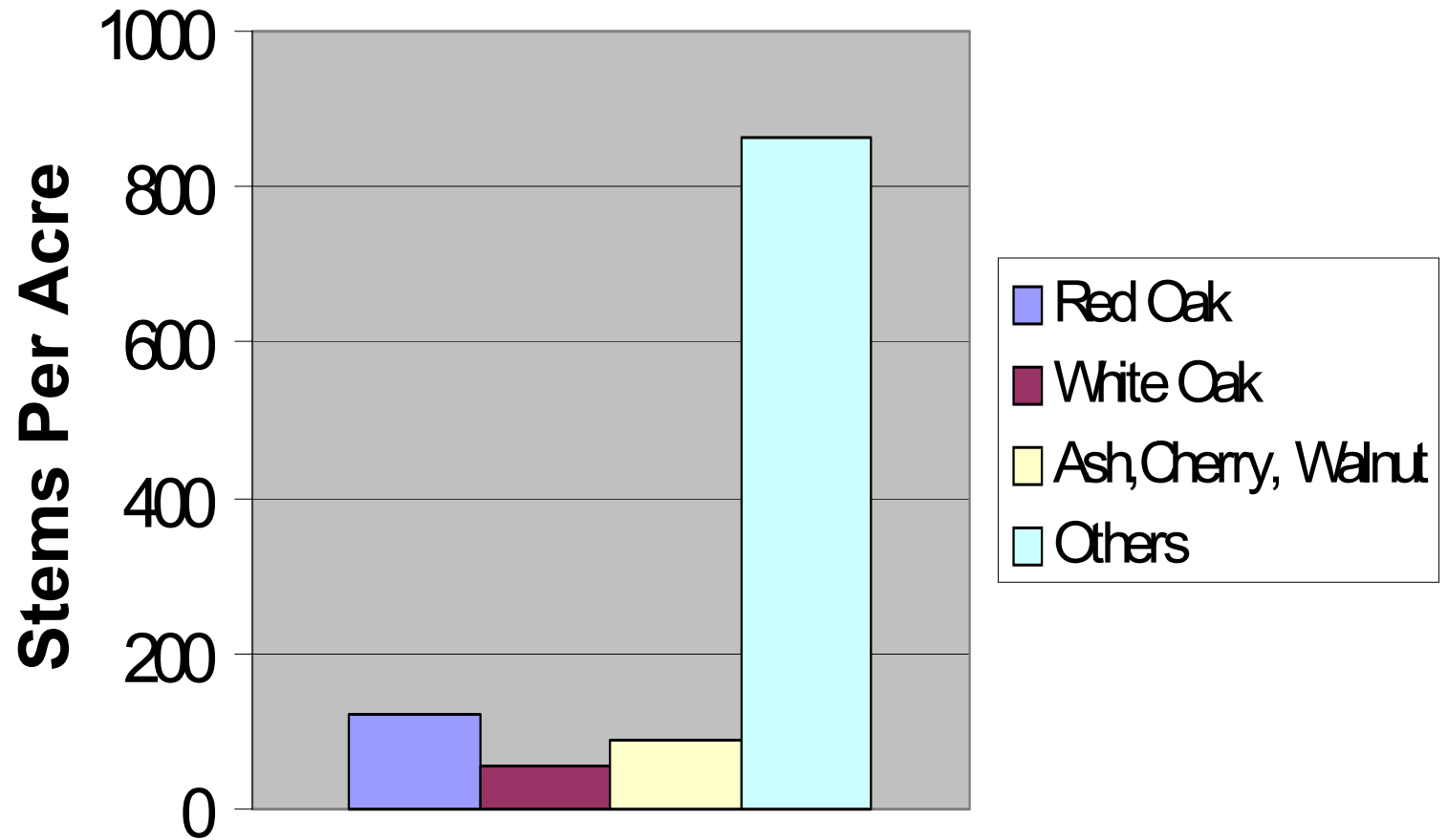
Total BA Post-RO borer 44 sq ft



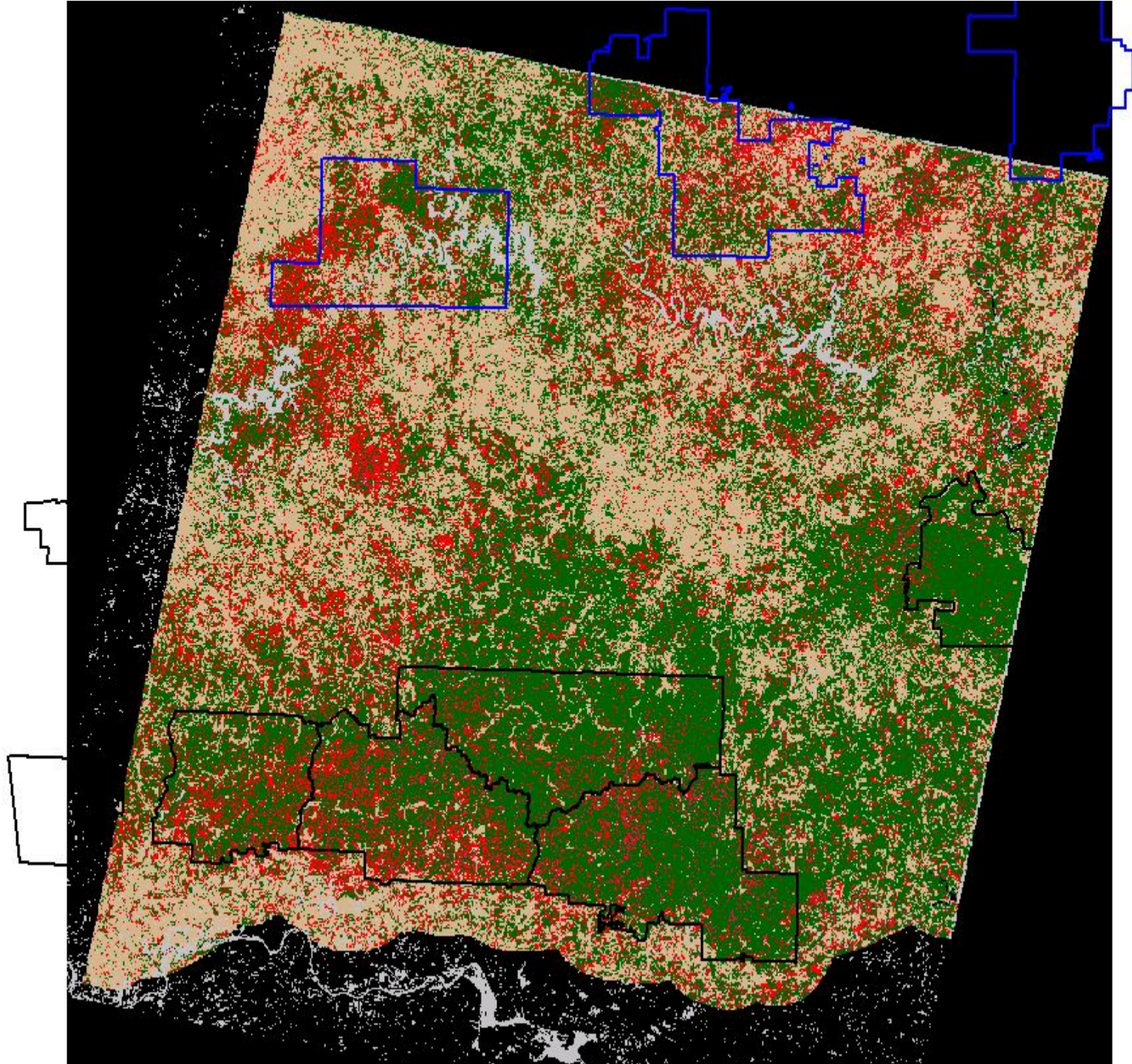
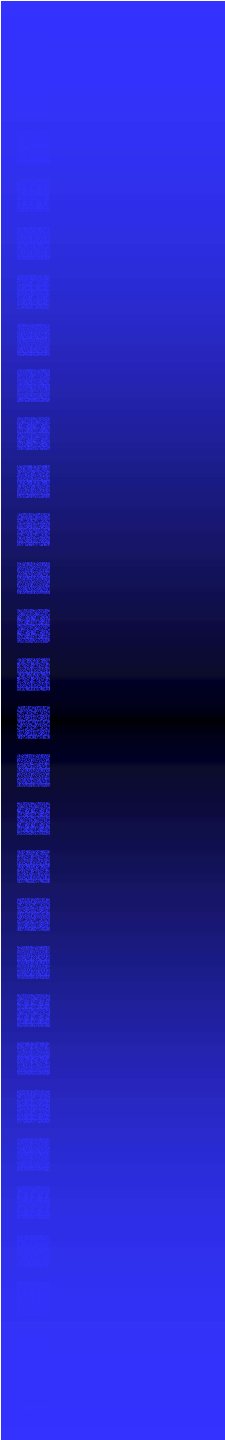
■ healthy oaks  
■ healthy others  
■ dying oaks

■ healthy ash, cherry, walnut  
■ dead oaks

# Relative Sapling Dominance



LANDSAT satellite imagery during the oak mortality time period is also being explored for usefulness in assessment and future monitoring efforts. Two images from different years taken during the same vegetative growth period are classified and analyzed for change in tree canopy. This process is called change detection.



# Management Strategies

300,000+ acres of damage is an awesome area to treat. The forest vegetation is planned to be treated where possible for three primary objectives:

1. Prevention
2. Suppression
3. Restoration

# Prevention

- The objective of treatment for prevention is to keep oak-hickory stands healthy. The primary tools available are thinnings and prescribed burning to limit stocking density and control understory and midstory vegetation.

# Suppression

- Identification of “brood trees” or infested trees followed by their removal from the stand using a sanitation or “forest health” thinning would occur in lightly or moderately infested stands.

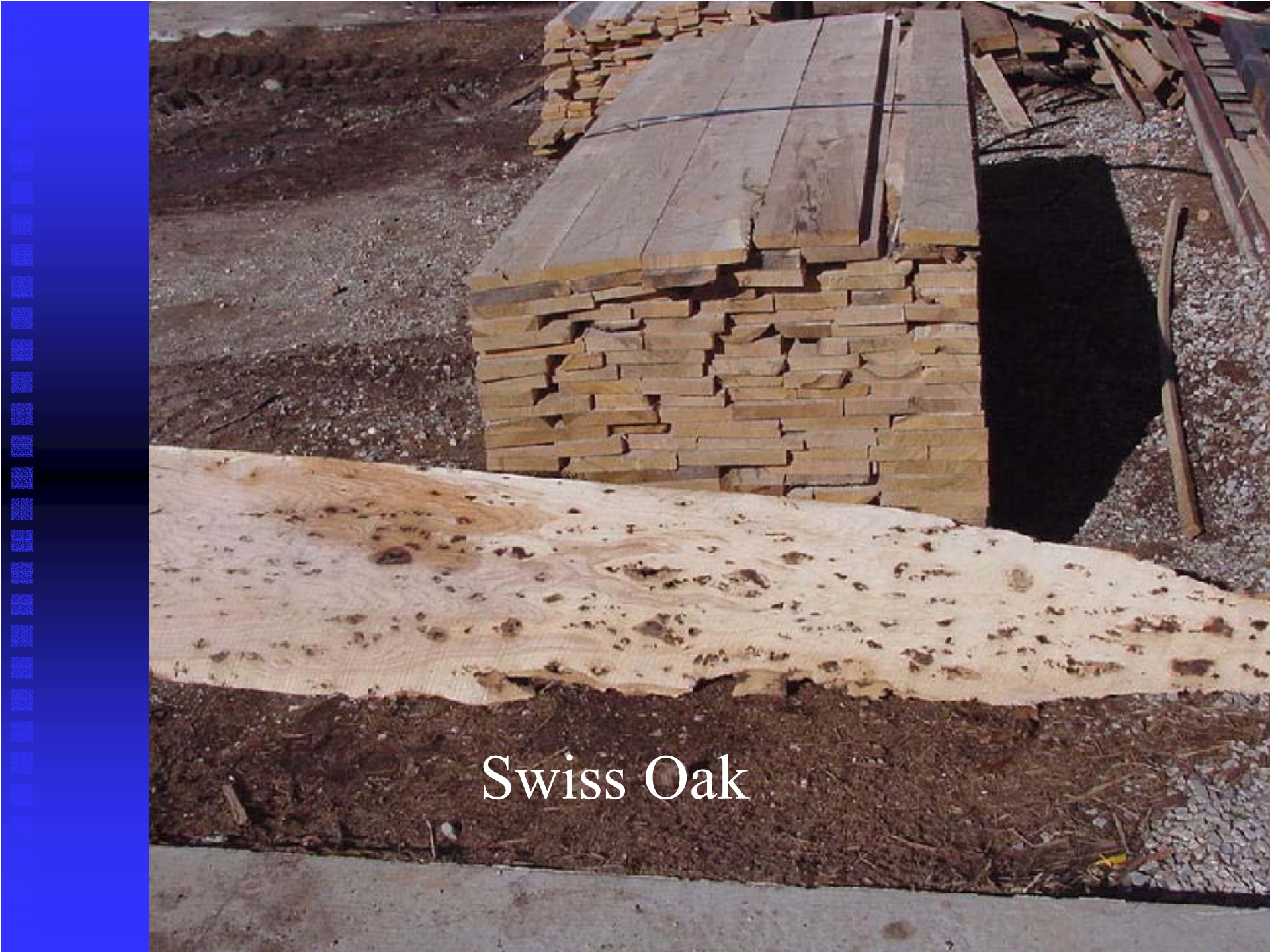
# Restoration

- Generally this term would apply to stands so damaged that replacement would be necessary. The overstory stand would be replaced by either artificial regeneration (planting/seeding), by advance regeneration already present or from stump sprouts, or by advance treatment of stands by burning and/or thinning to enhance oak regeneration.

Prescribed Fire appears to be the tool that could be of greatest benefit for oak restoration. Recent studies of Ozark fire history indicate a frequent presence of fire in the mountains prior to European settlement and the creation of the National Forests. Scientists have shown that fire will be needed to regenerate current stands back to oak types.

- The prescribed burning program for the Forest will be focused in the next few years on those areas with red oak mortality. In stands that have advanced regeneration of red oaks in the understory, the Forest will utilize prescribed fire to create a competitive advantage for red oak reproduction.

- At present, there is a market for oak that is degraded. The borer holes make the wood generally undesirable for lumber. Some wood is not structurally sound for pallets. Two large timber companies have increased procurement of hardwood logs for chips in the Arkansas River Valley. Firewood will be in plentiful supply but may far exceed demand. Commercial salvage timber sales continue to sell as the local timber industry is utilizing the wood for multiple products. One enterprising wood processing facility in Missouri is exploring selling “Swiss Oak”.



Swiss Oak

- ◆ Planting of nursery grown red oak seedlings will be increased over the next five years.

The forest goal will be 60,000 seedlings in 2002, 80,000 in 2003, and 100,000 by 2005.

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# Research

Because the severity of this red oak borer infestation is without precedent, there is a rare opportunity for research. The Southern Research Station, and Forest Health Protection – Region 8 consulted with scientists in Arkansas and surrounding states to identify areas of potential research.

However, these research proposals, like many of the other proposed strategy actions, will require supplementary funding in addition to expected appropriations.

- Research needs identified include:
  - ◆ Develop methods to assess risk of future oak mortality
  - ◆ Develop silvicultural prescriptions to reduce potential oak mortality
  - ◆ Determine ecological effects to the ecosystems of the Ozark Highlands including T&E species, plant and animal populations

## Conclusion

In the Ozarks there is a genuine concern for the amount of oak component that will be lost from the forest. The actions we plan to undertake will hopefully begin to reduce both the immediate and future threats to the hardwood ecosystem and the associated communities of the Ozark Highlands.

